

REMARKS/ARGUMENTS

The following remarks are believed responsive to the points raised by the Office Action dated September 5, 2008. In view of the following remarks, reconsideration is respectfully requested.

The Pending Claims

Claims 1, 4, 6-22, 27, 28, and 30-32 remain pending.

The Office Action

It is noted that the Office Action indicates “former claim 5 was inadvertently omitted in the previous rejections and thus the finality of the previous rejection is withdrawn.”

As reiterated by the undersigned to the Examiner during a telephone call on September 8, 2008, the undersigned specifically contacted the Examiner on June 27, 2007 requesting clarification of the rejection with respect to claim 5, and on that date the Examiner confirmed that claim 5 was only rejected on the grounds of double patenting. The Office Action does not suggest that the scope of claim 5 has changed between June 27, 2007, and the date of the most recent Office Action. Applicants note that they have incurred extra costs and delays in prosecution due to this Patent and Trademark Office (PTO) error, and this is particularly frustrating since Applicants’ response was only prepared after confirming matters with the Examiner.

Double Patenting/Terminal Disclaimer

Applicants reserve the right to withdraw the Terminal Disclaimer submitted in this application on August 13, 2008, in view of the change in course by the PTO, but will address the status of the Terminal Disclaimer at a later date, i.e., once the other issues relating to the prosecution of this application have been resolved.

Applicants respectfully request clarification in the next Office Action regarding the rejection on the grounds of Double Patenting. The most recent Office Action indicated the status of the Terminal Disclaimer was not resolved, and thus, the Office Action indicated the Terminal Disclaimer could not be stated to be “accepted.” However, the most recent Office

Action did not set out a rejection on the grounds of Double Patenting, e.g., it did not indicate that the previous rejection on the grounds of Double Patenting was maintained pending resolution of the status of the Terminal Disclaimer, or that the Double Patent rejection had been withdrawn based upon reconsideration of the previous rejection.

Rejections under 35 USC 103

a). Claims 1, 8, 9, 20, and 30-32 were rejected under 35 USC 103(a) as being unpatentable over U.S. Patent 6,251,215 to Zuniga et al. (hereinafter referred to as “Zuniga et al.”) in view of U.S. Patent 6,565,424 to Katagiri et al. (hereinafter referred to as “Katagiri et al.”) and U.S. Patent 5,584,751 to Kobayashi et al. (hereinafter referred to as “Kobayashi et al.”) or U.S. Patent 5,643,061 to Jackson et al. (hereinafter referred to as “Jackson et al.”).

b). Claims 1-4, 6-9, 11-13, and 18-22 were rejected under 35 USC 103(a) as being unpatentable over U.S. Patent Application Publication 2003/0070757 A1 to DeMeyer et al. (hereinafter referred to as “DeMeyer et al.”) in view of Katagiri et al. and Kobayashi et al. or Jackson et al.

b¹). It appears that claims 15-17 were rejected under 35 USC 103(a) as being unpatentable over DeMeyer et al. in view of Katagiri et al. and Jackson et al.

c). Claims 10, 11, and 14-17 were rejected under 35 USC 103(a) as being unpatentable over Zuniga et al. in view of Katagiri et al. and Kobayashi et al. as applied to claims 1, 2, 8, 9, 20, and 30-32 above, further in view of U.S. Patent Application Publication 2002/0049030 to Numoto et al. (hereinafter referred to as “Numoto et al.”).

NOTE: Jackson et al. was not cited in this rejection.

d). Claims 27-28 were rejected under 35 USC 103(a) as being unpatentable over Zuniga et al. or DeMeyer et al. in view of Katagiri et al. and Kobayashi et al. or Jackson et al. as applied above, in further view of U.S. Patent 6,390,908 to Chen et al. (hereinafter referred to as “Chen et al.”).

Each of these rejections is separately and respectfully traversed.

As an initial point, and with respect to the comments regarding claim 5, double patenting, and rejections “b¹.” and “c.” above, it is respectfully submitted that the exact bases for the some of the rejections are not clearly set out, even though it appears this Office Action was intended to correct previous inadvertent errors.

For subject matter defined by a claim to be considered obvious, the Office must demonstrate that the differences between the claimed subject matter and the prior art “are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.” 35 USC 103(a); see also *Graham v. John Deere Co.*, 383 US 1, 148 USPQ 459 (1996). The ultimate determination of whether an invention is or is not obvious is based on certain factual inquiries including: (1) the scope and content of the prior art, (2) the level of ordinary skill in the prior art, (3) the differences between the claimed invention and the prior art, and (4) objective evidence of nonobviousness. *Graham*, 383 US at 17-18, 148 USPQ at 467.

Consideration of the aforementioned *Graham* factors here indicates that the present invention, as defined by the pending claims, is unobvious in view of the cited references.

Regarding the scope and content of the prior art, none of Zuniga et al., Katagiri et al., Kobayashi et al., Jackson et al., DeMeyer et al., Numoto et al., or Chen et al., teach or suggest a retaining ring comprising a bearing ring made of a plastic material comprising a thermoplastic material, selected from the group consisting of PPS and PEEK, and abrasion-reducing and/or wear-reducing additives admixed with the plastic material, the abrasion-reducing and/or wear-reducing additives selected from the group consisting of PTFE, polyimide, and nanoparticles.

For example, there is no teaching or suggestion in Zuniga et al. of a bearing ring comprising abrasion-reducing and/or wear-reducing additives elected from the group consisting of PTFE, polyimide, and nanoparticles admixed with plastic material (*see*, Zuniga et al., col. 5, line 66, through col. 6, line 6).

Similarly, there is no teaching or suggestion in DeMeyer et al. of a bearing ring comprising abrasion-reducing and/or wear-reducing additives elected from the group

consisting of PTFE, polyimide, and nanoparticles admixed with plastic material (see, DeMeyer et al., paragraphs [0004], [008], [0022], and [0030], as well as claims 9 and 12).

The Office Action refers to Katagiri et al., col. 5, line 39, through col. 6, line 14 as the basis for a conclusion that this section provides motivation to construct the retaining ring of Zuniga et al. or DeMeyer et al. with the materials of Katagiri et al. for low wear, prevention of contamination and so that wafer edge deformation does not occur. However, Katagiri et al. fails to provide such motivation, and, in fact, teaches away from the claimed invention.

Katagiri et al. discusses in some length the pros and cons of different retaining ring structures, as well as one-part rings made of plastic materials (e.g., col. 5, lines 39-44). While Katagiri et al. refers to PPS and PEEK at col. 5, lines 43-44, Katagiri et al. emphasizes that these materials are *not dimensionally stable enough* to be successfully used for retaining rings (e.g., col. 5, lines 44-53), as they lead to the “technical problem regarding over-polishing in the wafer edge region” (col. 5, line 32).

Katagiri et al. goes on to state that the use of these plastic materials “plastically deform[s] the retainer ring 3” and increases the load at the wafer periphery resulting in over-polishing at the periphery (col. 5, lines 49-54). As a result of the problems with plastic materials, Katagiri et al. teaches away from the claimed invention, concluding that a metal material is needed, which is preferably coated with a plastic material (preferably a 10 to 100 micron thickness of plastic material; col. 6, lines 8-13), such that wafer edge deformation does not occur, or elasto-plastic deformation is negligible (col. 6, lines 3-12).

Additionally, Katagiri et al.’s invention is directed to eliminating elasto-plastic deformation, or making it “negligible” (col. 6, lines 10-12), by “keeping a retainer ring and surface of a polishing wheel [in] non-contact with each other and controlling the gap therebetween within a certain range and by setting compression strength of the retainer ring at more than 3,000 kg/cm²” (col. 3, lines 11-15). Thus, Katagiri et al. teaches away not only from using retaining rings with bearing surfaces, but by teaching *avoiding* contact between the retaining ring and the polishing surface, Katagiri et al. also teaches away from a retaining ring comprising a bearing ring made of a plastic material wherein the bearing ring rests “with a first front side on a polishing surface of a polishing apparatus.”

Furthermore, in addition to teaching away from using a plastic material to contact a polishing surface, Katagiri's recommendation to use polyimide "*instead of PEEK*" (col. 6, lines 13-14, emphasis added) as a coating material "while keeping the retainer ring and polishing wheel [in] non-contact with each other" (col. 6, lines 2-3) further leads one away from a "plastic material of the bearing ring comprising a thermoplastic material, selected from the group consisting of PPS and PEEK, and abrasion-reducing and/or wear-reducing additives *admixed with* the plastic material, the abrasion-reducing and/or wear-reducing additives selected from the group consisting of PTFE, polyimide, and nanoparticles" (emphasis added).

Accordingly, in view of the teaching away by Katagiri et al., and since Katagiri et al. does not cure the deficiencies of Zuniga et al. or DeMeyer et al., it is respectfully submitted that for these reasons alone, the rejections under 35 USC 103 are improper, and should be withdrawn.

The Office Action states that the term "releasably attached" has been given the broadest interpretation of adjustable and/or separable. However, the Office Action provides no basis or explanation for these conclusions. In particular, the Office Action does not explain why interpreting "releasably attached" as "adjustable" is reasonable in the context of the present specification. With respect to the citation to *In re Dulberg*, 289 F.2d, 522, 523, 129 USPQ 348, 349 (CCPA 1961) and the MPEP 2144.04 V C, *Dulberg* merely held that "[w]hether a cap is made manually removable depends upon whether it is desired to gain ready access to the space covered by the cap" (289 F.2d, 523, 129 USPQ 349). While the Office Action concludes it would have been obvious to construct the bearing ring and carrier ring separable for ease of assembly/disassembly for maintenance, Katagiri et al. teaches that the *entire* retaining ring should be replaced (col. 3, line 67 through col. 4, line 2, emphasis added) and thus there is no suggestion in Katagiri of disassembly for maintenance, and *Dulberg* and MPEP 2144.04 V C are inapplicable.

The Office Action correctly acknowledges that Zuniga et al. and Katagiri et al. fail to teach a flange. However, the Office Action states that Jackson et al. and Kobayashi et al. teach flanges, and concludes it would have been obvious to provide a flange in the apparatus of Zuniga et al. and Katagiri et al. to provide a lower limit to the motion of the retainer,

provide a damping action to any undulations that may form at the outer edge of the retaining ring, and support the weight of the carrier.

Zuniga et al. discloses a press fit, but fails to teach a press fit with a releasable non-rotatable connection, and the present application explains the advantages of a releasable non-rotatable connection (e.g., paragraphs [0007]-[0012]). Zuniga et al. also fails to teach either a connection between the bearing ring and the carrier ring at an *outer* circumferential surface where the bearing ring is provided with a step set back to receive the carrier ring or a flange projecting radially outwardly and enlarging the bearing surface of the bearing ring. As explained in the present application, such a projection provides various advantages, including increasing the life of the bearing ring, and obviating the need for an early exchange of the bearing ring (e.g., paragraphs [0032] and [0033]).

Jackson et al. merely discloses a retaining ring with a one-part design, there is no disclosure of a separate bearing ring and carrier ring, and of course there is no teaching of a carrier ring and bearing ring that are releasably connected to one another.

While the Office Action refers to flange **29** in Jackson et al., flange **29** is not part of the retaining ring. Rather, flange **29** is part of the polishing apparatus and serves for mounting the retaining ring **25** in a prior art device as shown in Fig. 1. Moreover, flange **29** in Jackson et al. extends radially inwardly.

While flange **93** is part of the retaining ring **49** in Jackson et al., the flange is within the rectangular cross section of the retaining ring, and is separated from the main body of the retaining ring by groove **91**. As is clear from Figs. 2-4 of Jackson et al., the retaining ring **49** and its flange **93** do not provide an additional protection against soiling and do not enlarge the bearing surface of the bearing ring.

There is no suggestion in Jackson et al. of a flange extending from the circumference of the bearing ring wherein the flange projects outwardly, so as to enlarge the bearing surface of the front side of the bearing ring, i.e., the surface of the side of the bearing ring which contacts the polishing part of the polishing apparatus, and there is no explanation in the Office Action as to why such a modification would have been obvious to one of skill in the art.

The Office Action also states that Kobayashi et al. teaches a flange. However, while Kobayashi et al. discloses a flange extending outwardly from a fixing ring **48**, the flange is not part of the retainer ring **50**, which is a separate structure. Moreover, the flange of fixing ring **48** is not provided on a bearing ring, and is not a flange that would serve to enlarge the bearing surface of the bearing ring.

Kobayashi et al. also discloses a flange **50A** that is a holding portion at the retainer ring **50**. Kobayashi et al., like Jackson et al., merely discloses a retaining ring with a one-part design, there is no disclosure of a separate bearing ring and carrier ring, and of course there is no teaching of separable and releasably connected bearing and carrier rings.

Additionally, the flange **50A** in Kobayashi et al. is a holding portion at the upper end of retainer ring **50** and therefore does not form part of the bearing surface, i.e., the front side of the bearing ring which abuts the polishing pad of the polishing apparatus, and there is no explanation in the Office Action as to why such a modification would have been obvious to one of skill in the art.

Accordingly, for these additional reasons, it is respectfully submitted that the rejections under 35 USC 103 are improper, and should be withdrawn.

The retaining ring of the present invention is patentably distinct from the cited references for the reasons set forth above. The facts that Numoto et al. may teach a snap ring and that Chen et al. may teach a ring including plastic are of no import. Neither Numoto et al. nor Chen et al., taken individually or in combination, cures the deficiencies set out above, and therefore, the combinations also fail to render the present invention obvious.

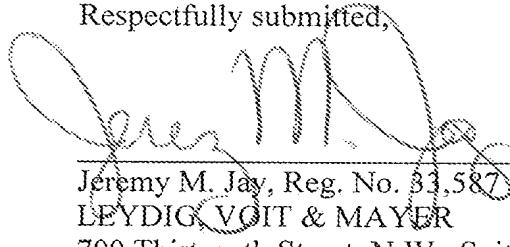
Considering all of the *Graham* factors together, it is clear that the present invention would not have been obvious to one of ordinary skill in the art at the relevant time in view of the combined disclosures of the cited references. Accordingly, the obviousness rejection should be withdrawn.

Since the independent claim is allowable for the reasons set forth above, the dependent claims are allowable as they depend from the novel and non-obvious independent claim.

Conclusion

Applicants respectfully submit that the patent application is in condition for allowance. If, in the opinion of the Examiner, a telephone conference would expedite the prosecution of the subject application, the Examiner is invited to call the undersigned attorney.

Respectfully submitted,



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